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(56) Documents cited
GB 1342190 A GB 0911954 A GB 0729980 A

(58) Field of search
UK CL (Edition J) E1J JGM JGN
INT CL⁴ E06B

(54) Draught excluder

(57) Draughts beneath doors (10) can be excluded by the use of a partly-inflated lay flat tube (20) which extends along the bottom edge (15) of the door and part of the way up the hinged edge (17). With the door closed, air is introduced into the tube through a non-return valve to inflate it into contact with the floor (13). When the door is opened, the tube relaxes towards its flat disposition, driving air into that part of its length which extends up the hinged edge. This relaxation takes the tube out of contact with the floor while the door is pivoting on its hinges (16). The non-return valve is a flap valve and the tube can be inflated using a drinking straw.

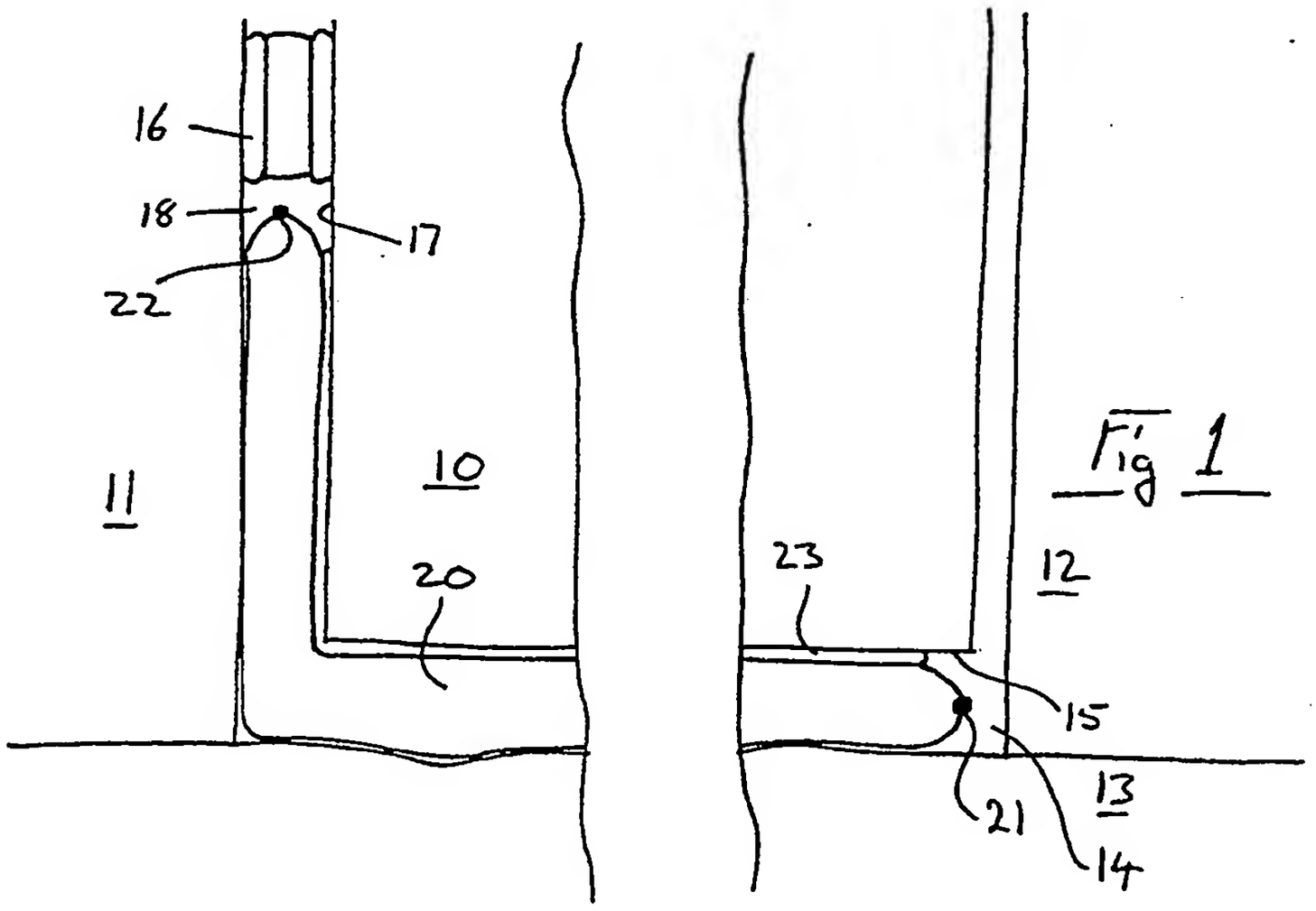

Fig 1

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1982.

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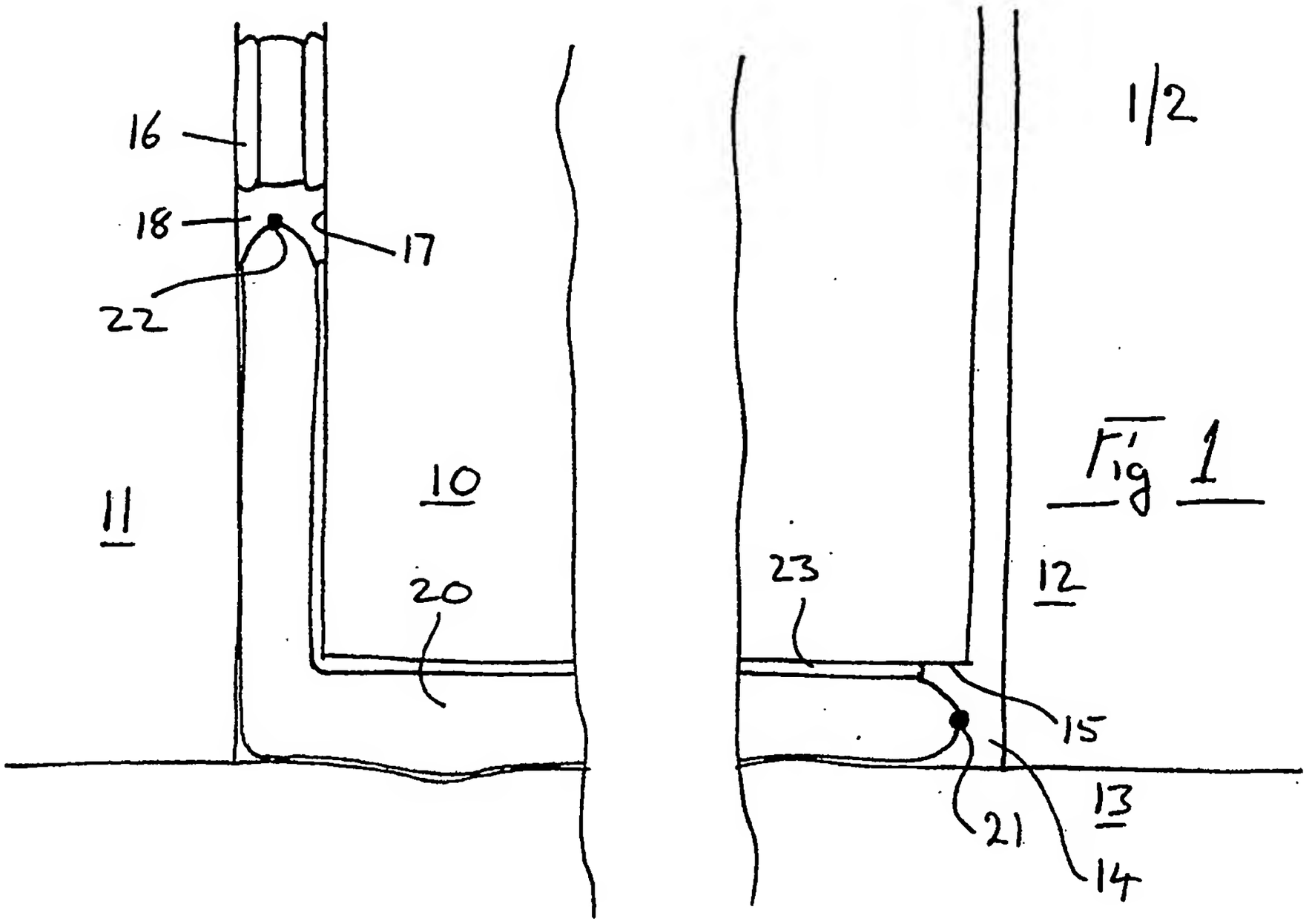

Fig 1

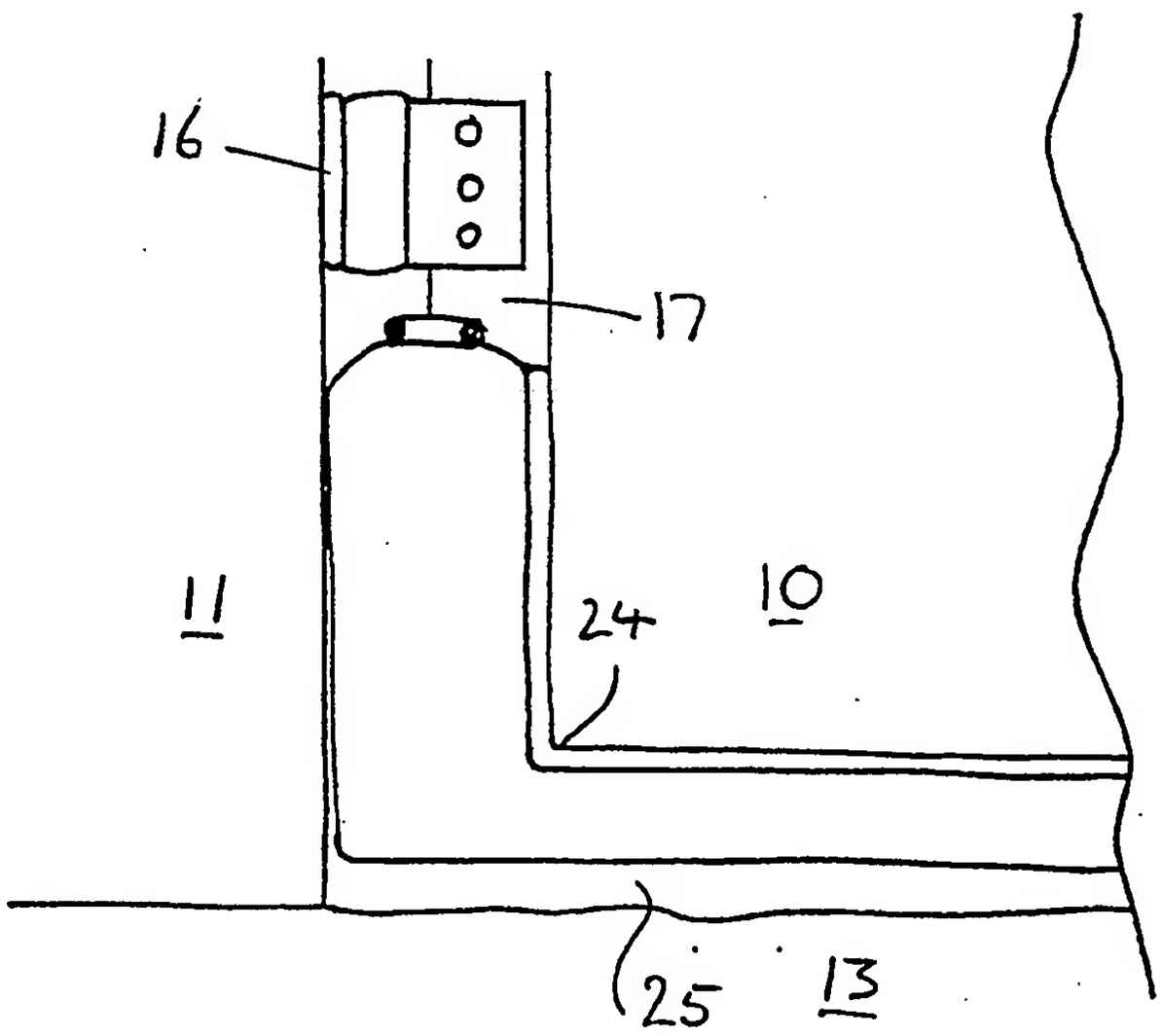

Fig 2

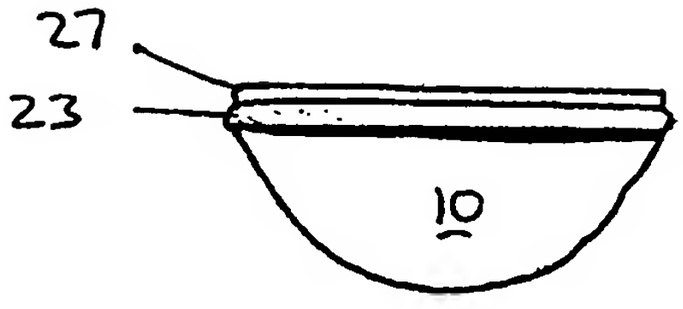

Fig 3

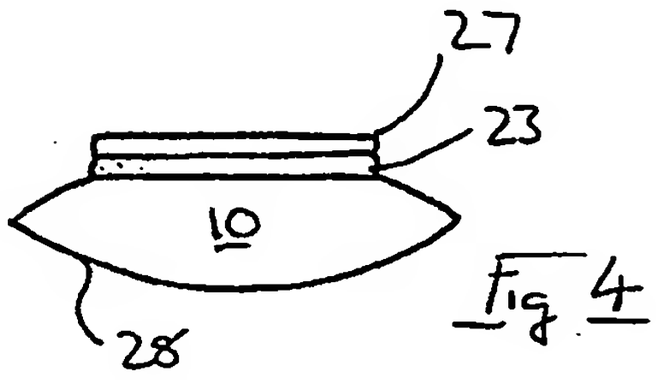

Fig 4

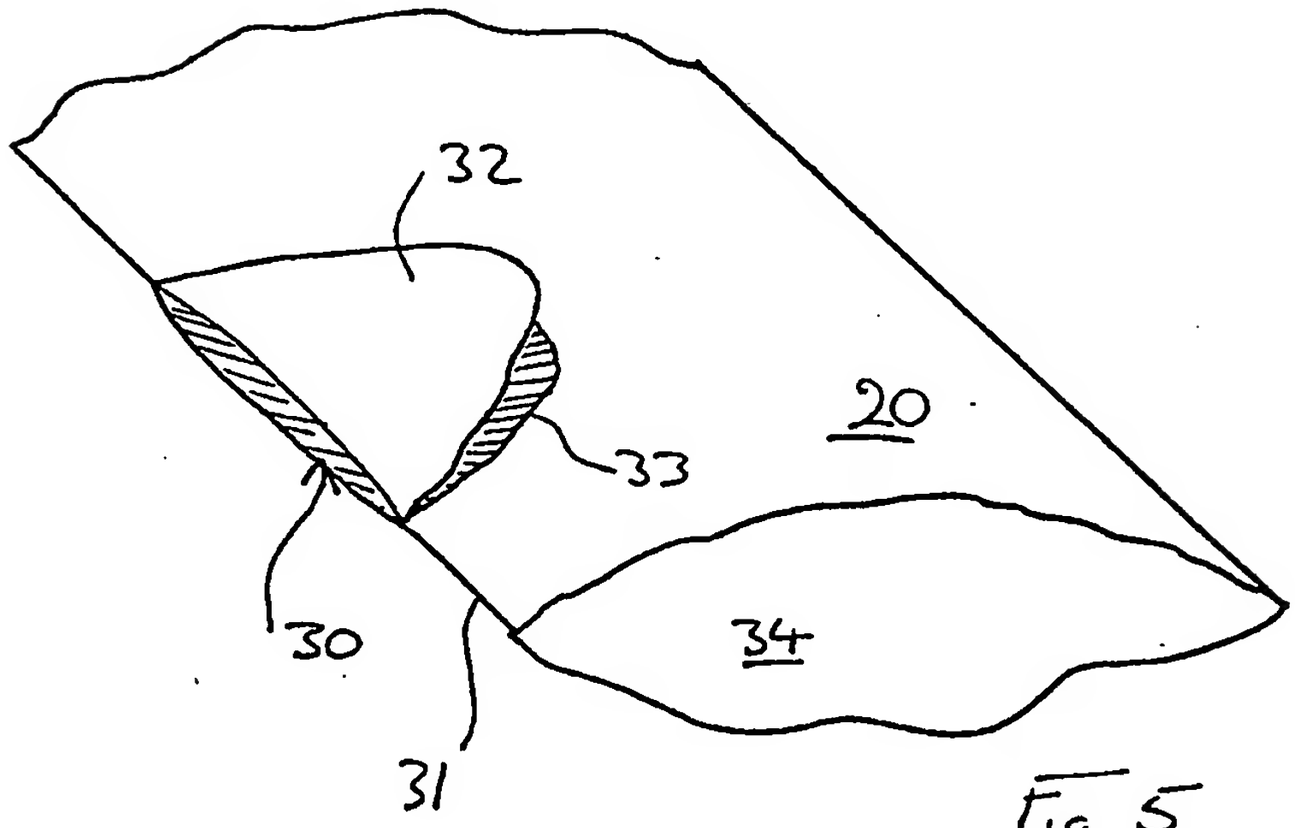

Fig 5

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DRAUGHT EXCLUDER

This invention relates to a draught excluder to seal a gap under a closed door.

The great variety of draught excluders available on the market testifies to the problems in providing an effective excluder which is cheap to make and easy to install. To meet a range of requirements, the draught excluder should be able to cope with under-door gaps of many different sizes, and with uneven floors. It is an object of the present invention to provide such a draught excluder.

According to a first aspect of the present invention there is provided a draught excluder to seal a gap under a closed door and comprising a hermetically sealed length of a lay-flat tube with two major surfaces on one of which is a longitudinal strip by which the tube may be bonded to the door edge to extend along the full length of the downward-facing bottom edge of the door and part way up the hinged edge of the door, the tube being provided with a non-return valve by which a selected quantity of air may be delivered into the tube.

According to a second aspect of the present invention there is provided a method of restricting flow of air through a gap below a closed door, the method comprising the steps of:

i) adhering a hermetically sealed length of a lay-flat tube along the full length of the downward-facing bottom edge of the door and part way up the hinged edge of the door;

ii) closing the door to captivate between the door and its frame, and so press flat, the portion of the tube which extends up the hinged edge; and

iii) delivering air through a non-return valve in the tube wall to the cavity within the tube, in such quantity as to expand the cavity and cause the tube to extend width-wise across the said gap, whereby flow of air through the gap below the door is restricted while the door is closed but, when the door is open, some of the air in the tube may flow in the tube, to occupy the portion on the hinged side of the door, and allow the width of the tube in its portion along the bottom edge of the door to fall, whereby the pressure of air within the cavity of the tube is not so high, at all times while the door is open, as to press against the floor any part of that portion of the tube which lies beneath the bottom edge of the door.

It is intended that the air should be delivered to the cavity within the tube at a time when the door is closed, so that substantially all the air so delivered remains present in the portion of the tube which lies beneath the bottom edge of the door. The delivery of air is discontinued when the width of the tube expands by enough to occlude the gap below the door. Then, on opening the door, some of the air in this portion of the tube can flow around the corner of the door edge into the portion of the tube which lies on the vertical hinge edge of the door.

Conveniently, the non-return valve is a flap valve, and air can be orally delivered to the tube cavity by the use of a drinking straw which extends through the non-return flap valve.

For a better understanding of the present invention, and to show more clearly how it may by carried into effect, reference will now be made, by way of example to the accompanying drawings, in which:

Figure 1 is a vertical section, for clarity partly cut away, of the draught excluder in position with the door closed;

Figure 2 is a similar vertical section, again partly cut away, showing the portion of the figure 1 tube which extends around the corner of the door edge, and with the door open;

Figures 3 & 4 are transverse sections of two alternative tube sections; and

Figure 5 is a perspective view of part of the length of the tube, showing its non-return flap valve.

Referring to Figure 1, a door 10 occupies a gap between wall portions 11 and 12 above a floor 13. There is a gap 14 between the floor 13 and a bottom edge 15 of the door 10. Hinges 16 connect a hinge edge 17 of the door 10 to the wall 11, and there is a gap 18 between the door and the wall. A lay flat tube 20 is sealed with a transverse weld 21 at the open edge of the door 10 and with a weld 22 at the hinge edge of the door. The tube 20 extends along the full length of the bottom edge 15 of the door, and up the hinge edge 17 nearly as far as the bottom hinge 16. An adhesive strip 23 bonds the top major surface of the lay flat tube 20 to the bottom and hinge edges 15 and 17 of the door. There is sufficient air in the tube 20 to cause the tube to span the full width of the gap 14 below the door, and it will be noted that the width of the tube 20 varies to accommodate the unevenness of the floor 13 below the door 10.

Referring now to Figure 2, the open disposition of the hinge 16 is an indicator that the door 10 is in an open disposition. As can be seen, the opening of the door has opened up the gap 18, allowing the width of the vertical portion of the tube 20 to expand, as air from the tube below the door 10 flows around the corner 24 of the door edge into the upright part of the tube. Thus, the width of the tube 20 below the door 10 becomes smaller, such that a gap 25 opens up between the tube 20 and the floor 13.

Referring now to Figure 3, this tube 10 has a "D-shaped" cross-section, with the adhesive strip 23 located along the straight edge of the D. A peel-away backing strip 27 overlies the strip 23.

The Figure 4 tube 10 has two identical major surfaces 28, with an adhesive strip 23 laid down the middle of one of these two surfaces. Again, there is a peel-away backing strip 27 on top of the adhesive strip.

Figure 5 shows a flap valve 30 provided in one long edge 31 of the lay-flat tube 20. Essentially, the valve has two like flaps 32 and 33 within the cavity 34 of the tube 20 and which are pressed together by air pressure within the cavity 34 to prevent outflow of air from the cavity 34 through the valve 30.

When installing the draught excluder, there should initially be little or no air inside the tube 20. In this condition, it is located beneath the door 10 so that one end of it is adjacent the vertical edge of the door remote from the hinges 16, and arranged so that facing upwards is the major surface of the tube 20 which carries the adhesive strip 23.

In this configuration, the backing strip 27 is progressively withdrawn and the adhesive strip 23 pressed against the bottom edge 15 of the door, working towards the hinge edge 17 of the door, and around the corner 24 of the door edge, until eventually the entire length of the tube is bonded to the bottom edge 15 and lowest part of the hinge edge 17 of the door. The tube 20 still contains little or no air, and the gap 14 below the door is still open.

At this stage in the installation of the draught excluder, the door is brought to a closed disposition. This restricts the width of the tube 20 in the upright portion of its length along the hinge edge 17 of the door. The flap valve 30 should be spaced from both the ends of the tube 20 so that it lies in that part of the length of the tube 20 which is below the bottom edge 15 of the door. Preferably the tube 20 is about 1m in length, with the flap valve about one third of the way along the length of the tube 20, and nearer the hinge end of the tube 20 than the end at the open edge of the door 10.

In any event, the flap valve lies below the door 10 and is accessible, for oral inflation of the tube 20, for example by introduction of the end of a drinking straw between the flaps 32 and 33 of the valve 30. By this means, air is delivered to the cavity 34 within the tube 20, to expand the tube width-wise across the gap 14, until the gap is closed. At this point, no more air is delivered to the tube, and the straw is withdrawn, to seal the flap valve 30. With the door in its closed disposition, the gap beneath it is sealed and the draught excluder is effective.

When the door is opened, however, air flows from the portion of the tube below the door 10 into the portion which extends up the hinge edge of the door. This movement of air reduces the width of the tube 20 below the door, thereby allowing pivotal movement of the door 10 without friction between the tube 20 and the floor 13 below the moving door.

It is to be noted that the bag is unlikely to be burst by rapid closure of the door, however fast the door is shut, because the reduction in width of the gap 18 is progressive rather than sudden, so that the air is progressively squeezed from the upright part of the tube 20 into the horizontal portion beneath the door 10.

In one embodiment, the lay flat tube 10 has a maximum width of 5cm and could be used to seal gaps of a width up to 3cm. A convenient length of tube, suitable for a variety of door widths, is 1m. In such a case, the valve can be about 66cm from one end of the tube, this one end being intended to be located at the open edge of the door.

The tube and valve can be made of polyethylene.

C L A I M S

1. A draught excluder to seal a gap under a closed door and comprising a hermetically sealed length of a lay-flat tube with two major surfaces on one of which is a longitudinal strip by which the tube may be bonded to the door edge to extend along the full length of the downward-facing bottom edge of the door and part way up the hinged edge of the door, the tube being provided with a non-return valve by which a selected quantity of air may be delivered into the tube.

2. A draught excluder as claimed in claim 1, wherein the non-return valve is a flat valve.

3. A draught excluder as claimed in claim 1 or 2, wherein the longitudinal strip comprises an adhesive strip and a peel-away backing strip on top of the adhesive strip.

4. A draught excluder substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.

5. A method of restricting flow of air through a gap below a closed door, the method comprising the steps of:

i) adhering a hermetically sealed length of a lay-flat tube along the full length of the downward-facing bottom edge of the door and part way up the hinged edge of the door;

ii) closing the door to captivate between the door and its frame, and so press flat, the portion of the tube which extends up the hinged edge; and

iii) delivering air through a non-return valve in the tube wall to the cavity within the tube, in such quantity as to expand the cavity and

cause the tube to extend width-wise across the said gap, whereby flow of air through the gap below the door is restricted while the door is closed but, when the door is open, some of the air in the tube may flow in the tube, to occupy the portion on the hinged side of the door, and allow the width of the tube in its portion along the bottom edge of the door to fall, whereby the pressure of air within the cavity of the tube is not so high, at all times while the door is open, as to press against the floor any part of that portion of the tube which lies beneath the bottom edge of the door.

6. A method according to claim 5, wherein the step of delivering air is accomplished orally, by the use of a drinking straw which extends between the flaps of a flap valve which contitutes said non-return valve.

7. A method of restricting under-door air flow, substantially as hereinbefore described with reference to the accompanying drawings.

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